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Wheat Rust and the Barberry

The rust of wheat is a well-known fungus disease. The fungus parasite lives in the tissues of the leaf or stem of the wheat plant, and not only uses up the food material which ought to be devoted to filling out the wheat kernels, but injures the green tissues so that they have less ability to produce this food material. Rust lessens the yield of wheat and is often responsible for a crop of small, shrivelled kernels of poor grade.

Rust is recognized on the stem or leaves of wheat as reddish or orange colored pustules from which a yellow dust is given off and scattered about in the wind. This dust is made up of countless spores of the rust fungus each, like a seed, capable of forming a new rust spot if it falls on a wheat plant and can get moisture enough to germinate and grow. The very large number of spores in each pustule explains why rust can spread over a wheat field so rapidly.

There are really two kinds of rust fungi on the wheat; one of them is known as the Yellow, or Leaf Rust, because of its color and because it occurs most abundantly on the leaves; and the other is called the Black Stem Rust. The latter produces somewhat darker rust pustules which are often found on the wheat stem. While the leaf rust is found more or less every year and damages the wheat to some extent, the Black Stem Rust is the one that is most harmful to the crop. Towards harvest time the pustules of the stem rust may be seen on the straw as black spots or streaks.

The Black Stem Rust has two kinds of spores, one of which comes in summer and is reddish or orange in color, and the other consisting of black spores which give the characteristic color to the pustules near harvest time. The summer spores spread about to other wheat plants and thus increase the number of rust spots, but the later crop of dark spores carries the rust fungus over winter.

These black spores cannot infect wheat at any time, even after winter and the rust will die out altogether if they can not reach their other host plant—the barberry. When the barberry leaves appear in spring, infection may start on them from spores overwintered in the black pustules on old straw or stubble. If the fungus can thus get to the barberry, it grows into the leaf and forms a yellow or orange spot, thickened into a pad and later

bursting out (in May) into a series of tiny cups, each filled with orange spore-dust. If this crop of spores on the barberry leaf is near enough to be carried to a growing wheat field, the rust may start again in the wheat. In the absence of barberry, the stem rust spores will perish and the wheat plants will either escape the disease or if any spores come in from a distance, it will be so late in starting that not much harm will be done.

From this relation between the rust fungus, the wheat and the barberry, it will be clear that barberry plants are likely to be a nuisance anywhere near a wheat field. It is for this reason, that the Department of Agriculture urges everyone to get rid of barberries where these occur in a wheat growing district. A single harmless looking barberry plant may cause losses of hundreds of dollars to the wheat fields nearby.

Not all kinds of barberries act as an alternate host for this rust fungus. It is the common or European barberry which is dangerous and not the Japanese species. One can distinguish these plants readily. The European barberry is a rather tall plant; its leaves are toothed on the edges; its bright red berries are oval and grow on a single stalk like a bunch of grapes; and the thorns on the stem occur in groups of three. The harmless Japanese barberry is a smaller plant; its leaves are smooth on the edges; the berries are oblong and grow in clusters like sweet cherries; and the thorns on the branches are single.

The dangerous European barberry was often planted years ago around houses as an ornamental plant and many of these ancient relics still survive. And because the fruits were eaten by birds and the seeds scattered in waste places, many of these barberry plants are now growing wild in rocky land, along fences, in pastures and in the woods. Several cases are known in this state where long continued failure of the wheat crop in a district has been traced to black stem rust, kept alive over winter by nearby wild barberry plants. The barberry in these cases was so near the supply of black stem rust spores on straw and stubble that the barberry leaves became heavily spotted with the rust spots and from these, the rust was able to start in adjacent wheat fields so plentifully and so early in the season that before the wheat ripened there was plenty of time for it to multiply and spread all over the neighborhood. Naturally the wheat crop under such conditions was poor and shrivelled.

How can barberry plants be destroyed? Of course the obvious way is to dig them out; but this takes time and labor and besides, if all the roots are not carefully removed, new plants are likely to spring up.

Another method is to kill the plants by pouring kerosene about the base. From a quart to a gallon will be needed for each plant,

depending on the size of the bushes. One must apply the kerosene slowly, so as to let it soak around the crown very thoroughly. While kerosene will kill at any time of the year, best results are likely to come from treatment in early summer, when drought and heat can be counted on to help.

Slightly cheaper than kerosene and equally effective is an application of salt. The cheapest salt, such as that used in ice cream making, is quite satisfactory for the purpose. It should be piled in a heap, so as to cover the crown and surround the various stems and must be used at the rate of 2-10 pounds per plant, depending on the size. The salt treatment is more effective in hot weather. Salt is much easier to carry and apply than kerosene, especially in dealing with wild barberries on waste, rough land.

Sodium arsenite solution is also effective in killing barberry plants. The arsenite solution is obtainable commercially or can be made up as follows: To 8 pounds of white arsenic and about 2 pounds sodium hydroxide are added sufficient water to make a gallon. For use, this amount is added to 40 gallons of water, which is then applied at the rate of 1 quart to 2 gallons per plant. As this material is a deadly poison, it is not safe to use where cattle or other animals can get at it. For all ordinary cases, the salt treatment is recommended.

Where barberry is growing on home grounds and has a certain ornamental usefulness, many people hesitate to dig it out and so leave a gap in their shrubbery plan. Why not plan to replace the barberry by some other shrub such as Bush Honeysuckle, Weigela, Deutzia, Forsythia, Althaea, Snowberry or others of similar type, most of them much superior to barberry in ornamental value? For hedge use, there are available Box, Privet (Anoor, Regel, California) Arbor vitae, Althaea, Norway Spruce and of course, the harmless Japanese Barberry, so much in demand for this purpose.

The Department of Agriculture recommends the general elimination of the European Barberry all over the state wherever wheat or oats are produced. The farm owners are urged to look for these plants on their premises and destroy or replace them as soon as possible. Wild plants should be thought of as well as those planted about houses.

Residents of towns and villages in grain growing neighborhoods are requested to avoid planting European (not Japanese) barberry plants and to make an effort to replace those now growing. Town and city park officials and commissioners can help much by eliminating barberry from their present and future plans for civic improvement. The chief danger in urban barberries lies not so much in spreading rust, as in providing a seed supply which birds

may distribute over the neighboring country and thus increase the wild barberry population.

The schools of our state might well undertake to explain the role of the barberry in spreading black stem rust; help the pupils to recognize the European barberry and distinguish it from the harmless Japanese species, and encourage the policy of barberry elimination.

Wheat is more important than barberries.